Fig. 1

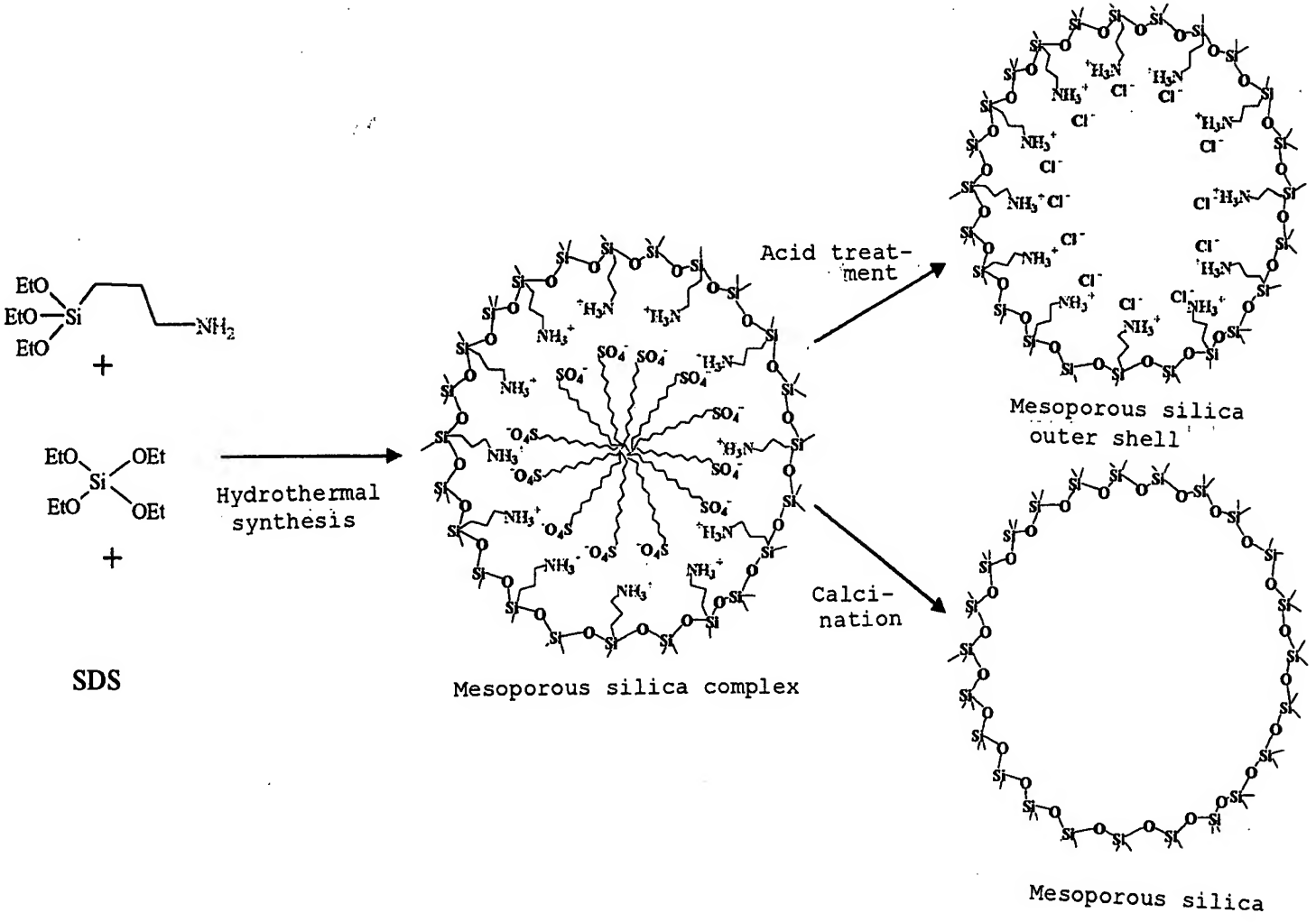


Fig. 2

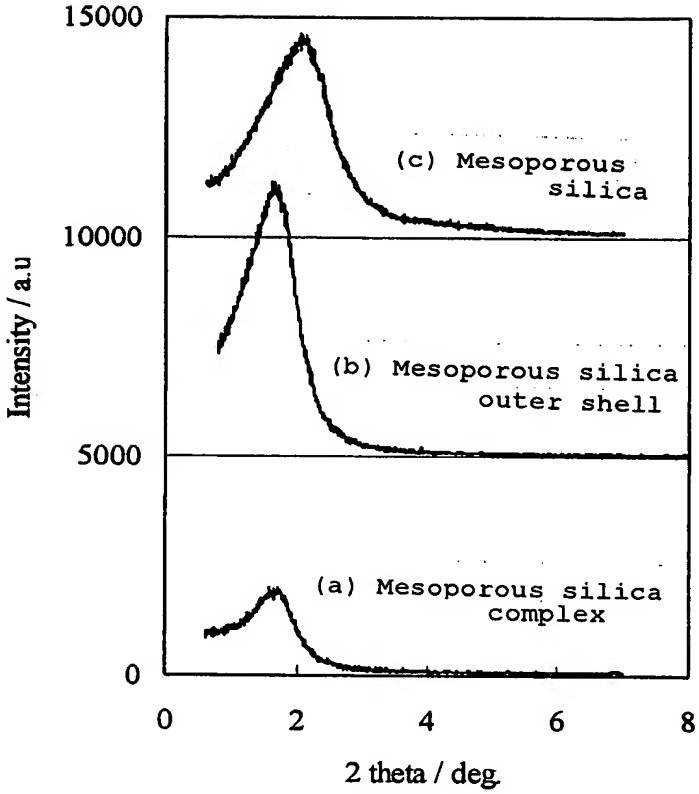
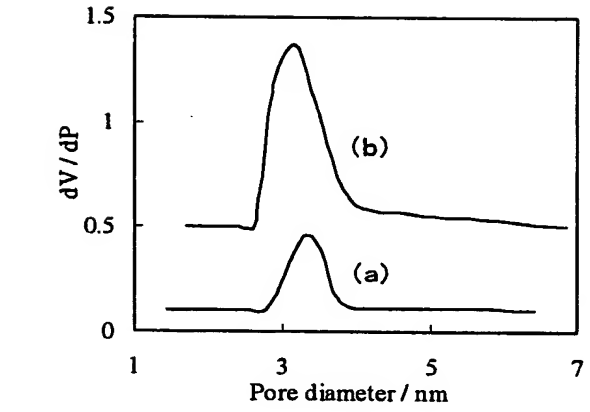

15000
10000
5000
0
Intensity / a.u
(c) Mesoporous silica
(b) Mesoporous silica outer shell
(a) Mesoporous silica complex
0
2
4
6
8
2 theta / deg.

Fig. 3


1.5
1
0.5
0
dV / dP
(b)
(a)
1
3
5
7
Pore diameter / nm

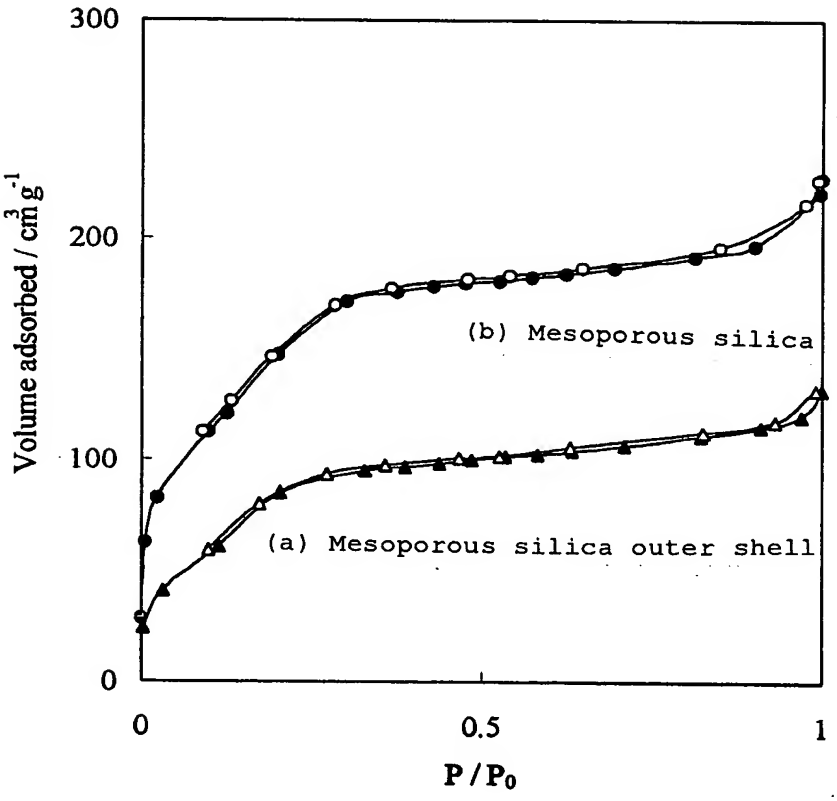

300
200
100
0
Volume adsorbed / cm3 g-1
(b) Mesoporous silica
(a) Mesoporous silica outer shell
0
0.5
1
P / P0

Fig. 4

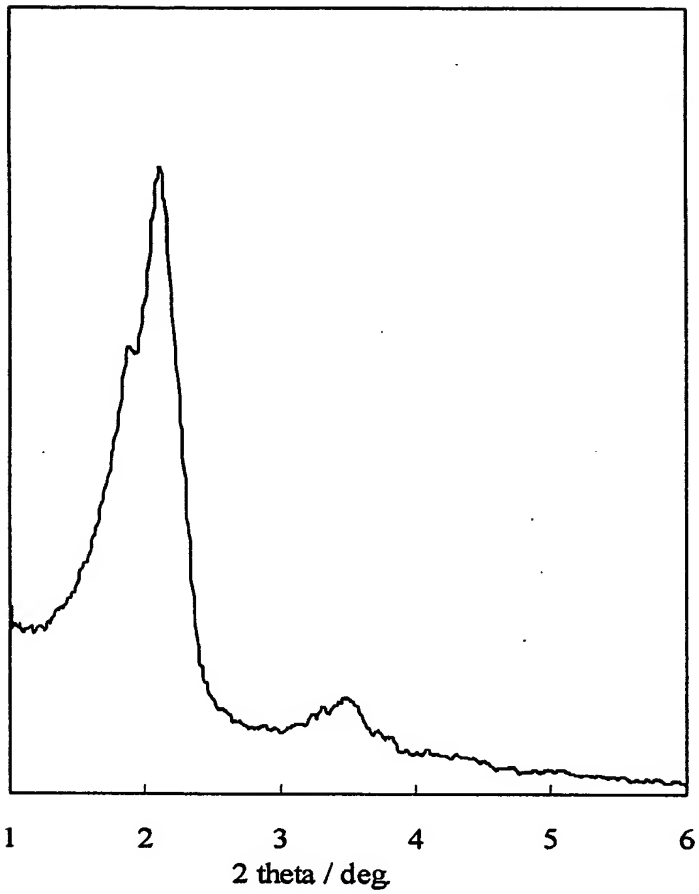


Fig. 5

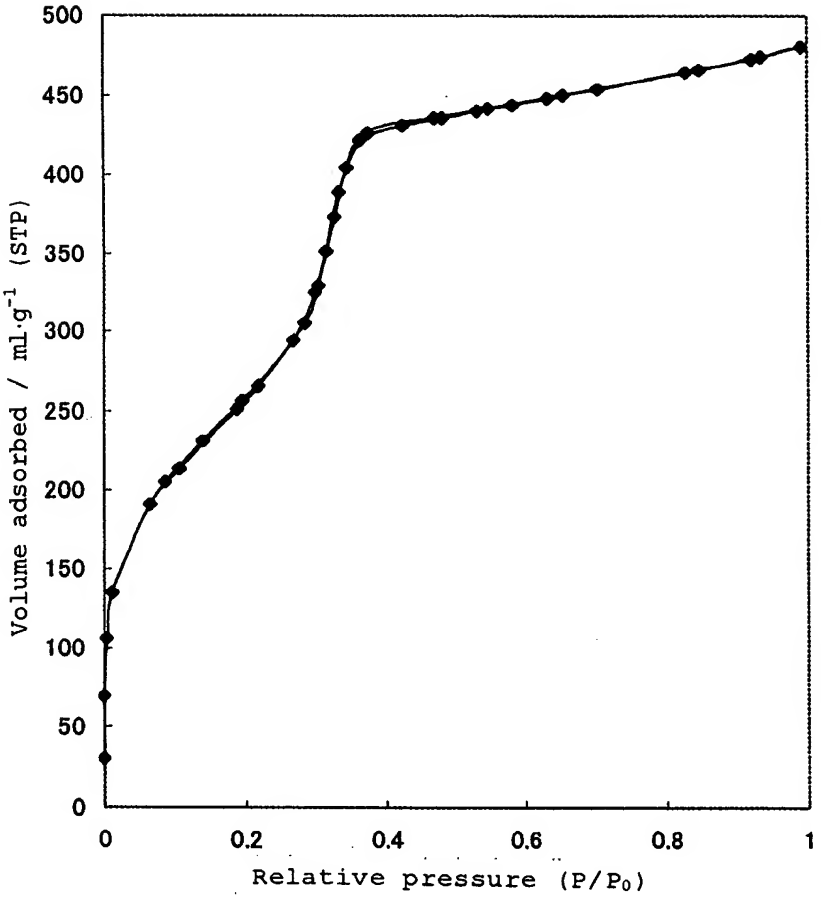

500
450
400
350
300
250
200
150
100
50
0
Volume adsorbed / ml·g-1 (STP)
0
0.2
0.4
0.6
0.8
1
Relative pressure (P/P0)

Fig. 6

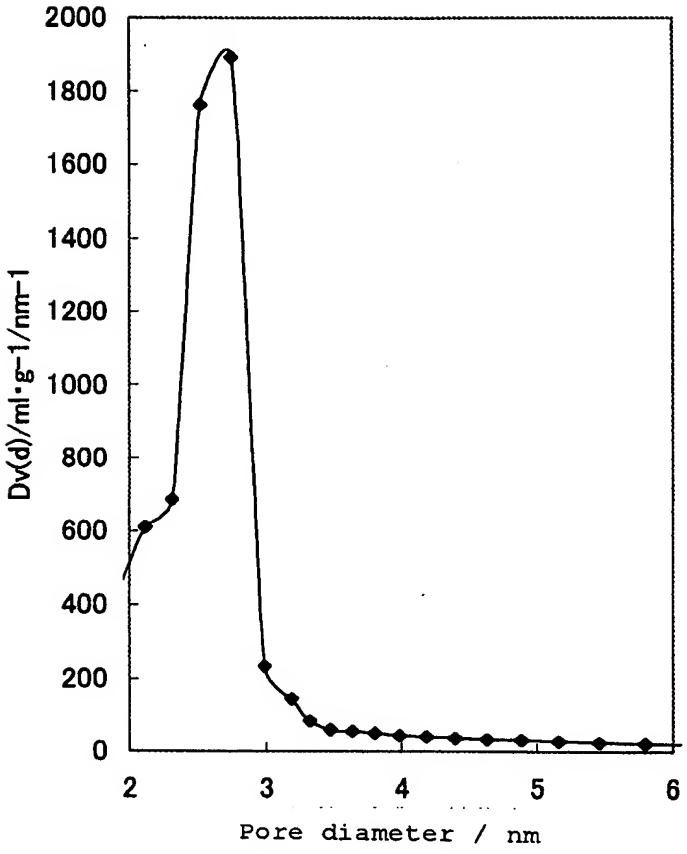

2000
1800
1600
1400
1200
1000
800
600
400
200
0
Dv(d)/ml·g-1/nm-1
2
3
4
5
6
Pore diameter / nm

Fig. 7

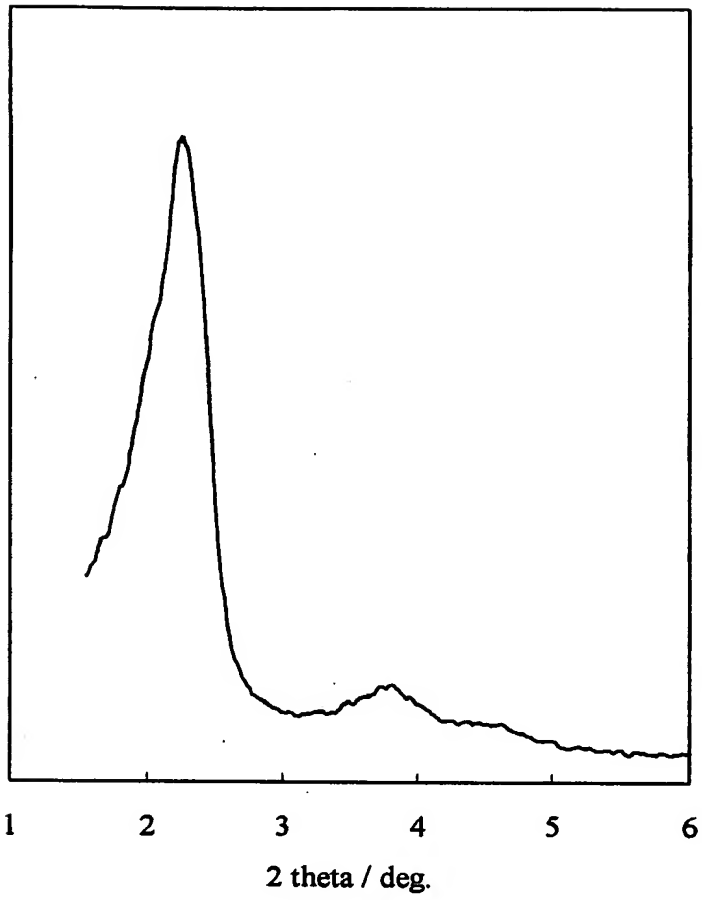


Fig. 8

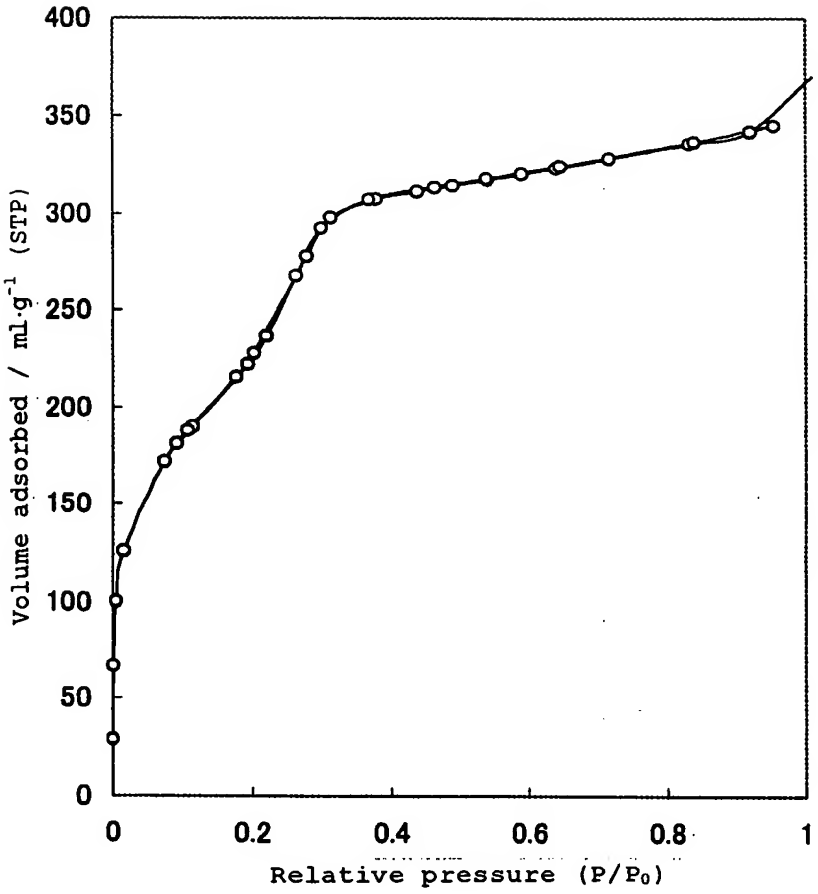
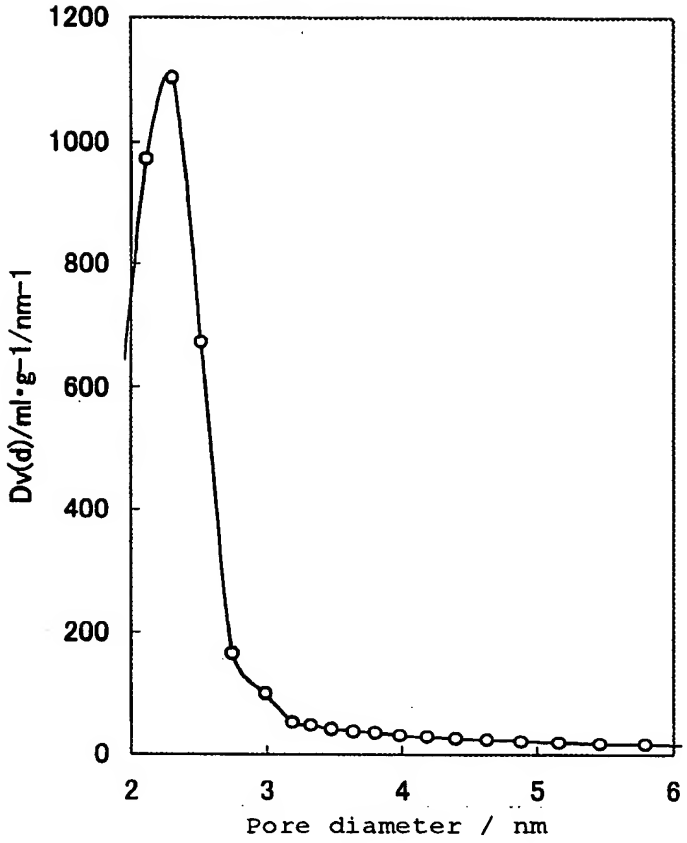

400
350
300
250
200
150
100
50
0
Volume adsorbed / ml·g-1 (STP)
0
0.2
0.4
0.6
0.8
1
Relative pressure (P/P0)

Fig. 9


1200
1000
800
600
400
200
0
Dv(d)/ml•g-1/nm-1
2
3
4
5
6
Pore diameter / nm

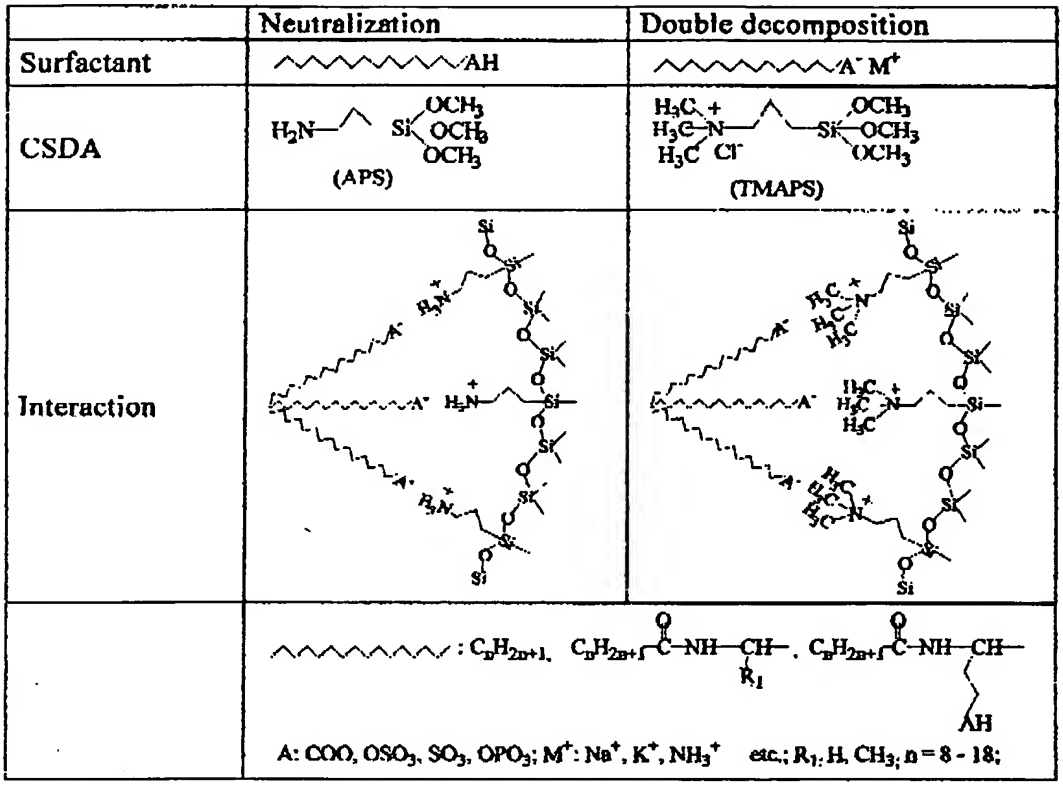


Fig. 10. Schematic illustration of the two types of amino group-anionic surfactant head group interactions: through neutralization of acid with primary aminosilane APS and double decomposition of negatively charged anionic salt surfactant with positively charged quaternized aminosilane TMAPS.

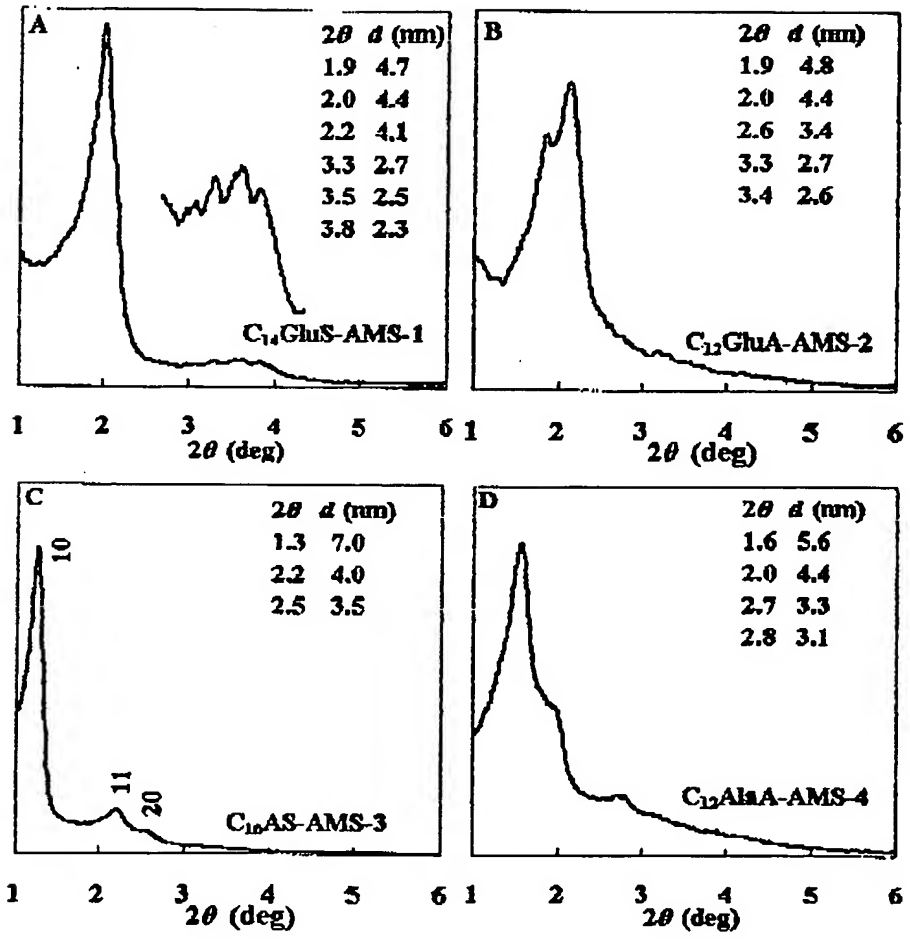


Fig. 11. XRD patterns of cacined AMS-n mesoporous silica. The chemical mol composition of the reaction mixture was (A) C_{14}GluS-AMS-1, C_{14}GluS:TMAPS:TEOS:H_2O 1:2:10:2405 (at 100 °C for 3 d); (B) C_{12}GluA-AMS-2: C_{12}GluA:APS:TEOS:H_2O 1:2.5:18.5:1905 (at 100 °C for 2 d); (C) C_{16}AS-AMS-3: C_{16}AS:TMAPS:TEOS:H_2O 1:1:9:1544 (at 60 °C for 1 d); (D) C_{12}AlaA-AMS-4, C_{12}AlaA:APS:TEOS:H_2O 1:0.75:7.5:1505 (at 60 °C for 1 d). XRD patterns were recorded on an MX Labo powder diffractometer equipped with Cu Kα radiation (40

kV, 20 mA) at the rate of 1.0 deg/min over the range of 1.5 – 10.0 ° (2θ).

Supporting on line materials:

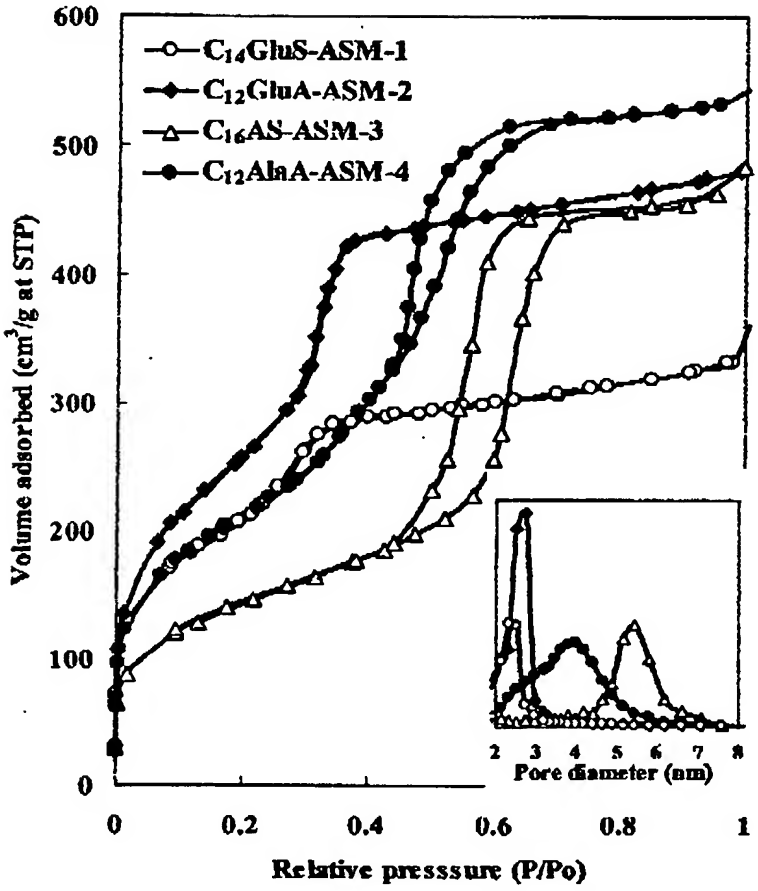


Fig. 12. N_2 adsorption-desorption isotherms and BJH pore size distributions of AMS-n mesoporus silica shown in Fig. 11. The isotherms were measured at -196 °C on a Belsorp 28SA sorptionmeter.

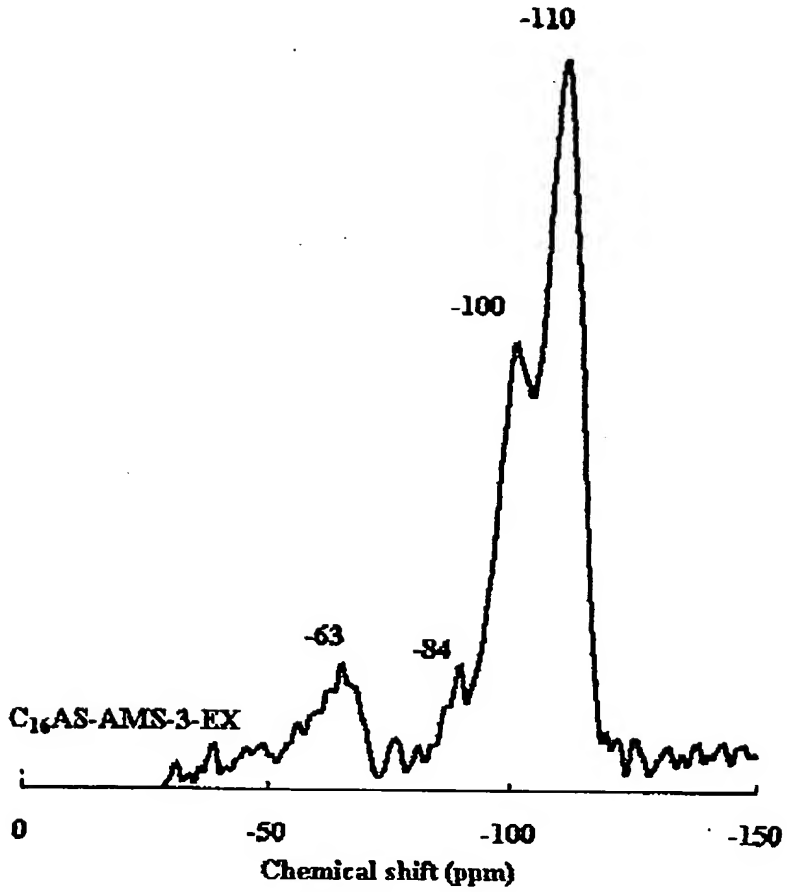


Fig. 13 shows CP ^{29}Si NMR spectra of extracted AMS-3 silica C_{16}AS-AMS-3-Ex. The spectra were collected at a JEOL-LA400WB 400 MHz spectrometer at 79.4 MHz and a sample spinning frequency of 5 kHz, respectively.